

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Total Maximum Daily Load Information Sheet

Big Creek

Water Body ID: 0444

Water Body Segment at a Glance:

County: Harrison
Nearby Cities: Bethany
Length: 31.5 miles
Pollutants: Ammonia
Low Dissolved Oxygen
Source: Bethany Wastewater
Treatment Plant



State Map Showing Location of Watershed

Scheduled for TMDL development:

TMDL development schedules are subject to change.

The most current schedule for TMDL development is available on the department's website at dnr.mo.gov/env/wpp/tmdl/wpc-tmdl-progress.htm.

Description of the Problem

A water body is considered impaired when it fails to meet applicable water quality standards. Water quality standards consist of designated uses, water quality criteria, an antidegradation policy and implementation procedures. Big Creek is impaired due to exceedances of water quality criteria for the protection of aquatic life.

Designated uses of Big Creek*

- Warm Water Habitat (WWH)
- Whole Body Contact Recreation Category B (WBC-B)
- Secondary Contact Recreation (SCR)
- Human Health Protection (HHP)
- Drinking Water Supply (DWS)
- Irrigation (IRR)
- Livestock and Wildlife Protection (LWP)

*In addition to these specific uses, all waters of the state are protected by the general water quality criteria that are specified in the state's Water Quality Standards at 10 CSR 20-7.031(4).

Designated use that is impaired

- Warm Water Habitat (WWH)

Criteria that apply

- In the Missouri Water Quality Standards, found in 10 CSR 20-7.031 Table A, the criterion for dissolved oxygen is a minimum of 5.0 mg/L (milligrams per liter).
- Chronic and acute criteria for ammonia vary with water temperature and pH and are presented in Tables B1 through B3 of Missouri's Water Quality Standards.¹

Background information and water quality data

In water quality studies conducted by the department in July and Sept. 2003, the creek was found to be high in ammonia. Ammonia is a common by-product of wastewater treatment and, under certain conditions, can be toxic to aquatic life. The acute ammonia criterion was exceeded on three days (data in table). The chronic criterion, which is based on a 30-day exposure, could not be established from these short-term studies. Even so, the ammonia criterion was consistently violated during low flow conditions, which in portions of Big Creek, can last for more than 30 days. For dissolved oxygen, if more than 10 percent of measurements in a water body fail to meet the water quality criteria, that water body is judged to be impaired. During the 2003 studies, low levels of dissolved oxygen were documented in Big Creek in six of 11 samples (54 percent) taken from sites below the Bethany WWTP.

Big Creek Ammonia and Dissolved Oxygen Data*

Site	Sample Date	NH3-N (mg/L)	Dissolved Oxygen (mg/L)
3	23-Jul-03	13.4	8.6
3	24-Jul-03	11.2	1.8
3	3-Sep-03	17.9	19.3
3	4-Sep-03	15.6	3
2	23-Jul-03	1.96	6.7
2	24-Jul-03	1.83	2.7
2	3-Sep-03	9.45	2.8
2	4-Sep-03	8.71	2.5
1	24-Jul-03	0.01499	5
1	3-Sep-03	0.01499	11.8
1	4-Sep-03	0.01499	3.2

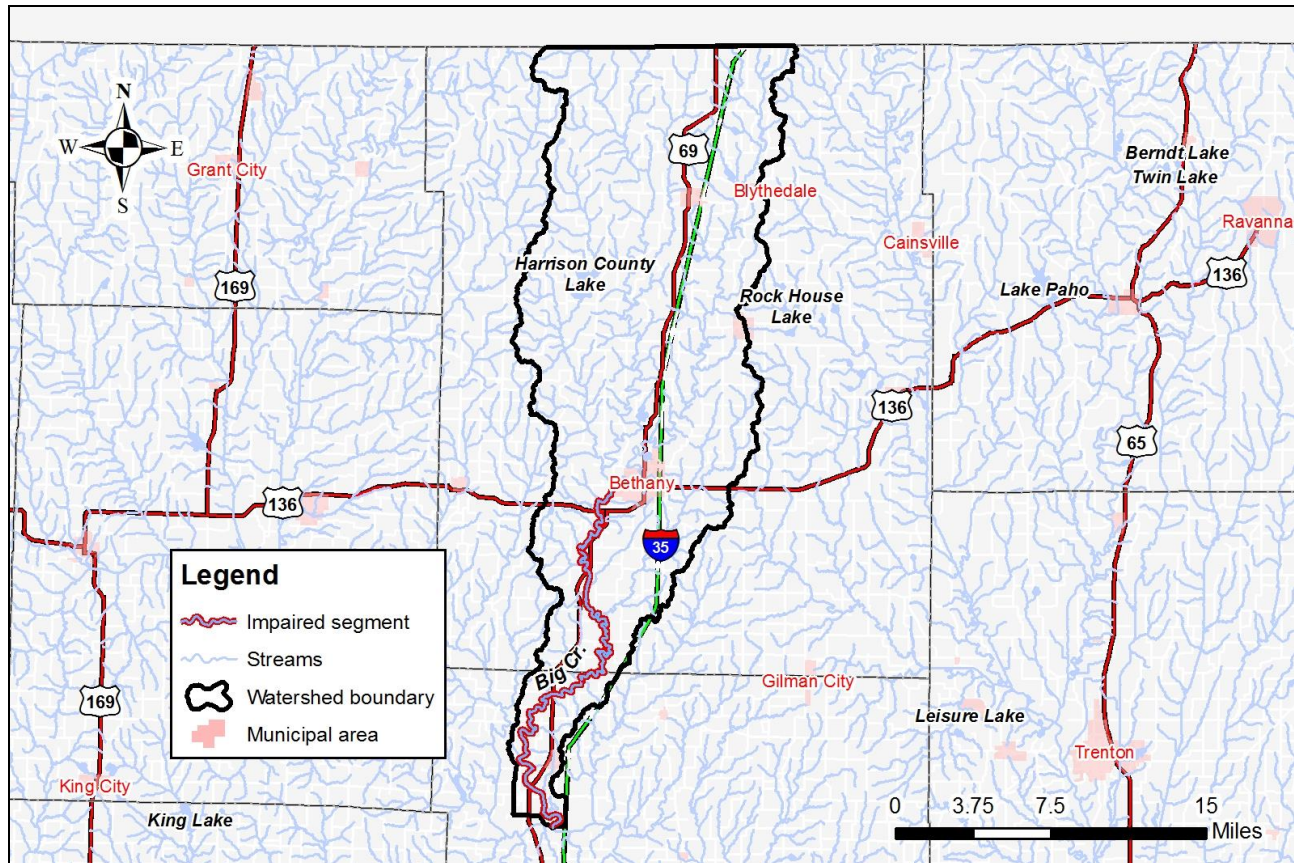
*shaded cells indicate excursions of water quality criteria

TMDL for Big Creek

The Big Creek TMDL will calculate the maximum amount of each listed pollutant that the stream can receive and still meet water quality standards. The TMDL will also identify all potential or suspected pollutant sources in the watershed and distribute the allowable pollutant loads among those various sources. When developed, the Big Creek TMDL will use the most current and available data. For this reason, the final TMDL may present information that differs from that contained in this information sheet.

¹Acute criteria apply to short exposures to toxic conditions that aquatic creatures can survive without harm. Chronic criteria apply to conditions producing adverse effects on aquatic life following long-term exposure but having no readily observable effect over a short time period. Chronic criteria are much lower than the acute criteria.

Map of the Big Creek Watershed



For more information call or write:

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